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Medical School Graduates Who Leave California

A Study at the University of California, San Francisco

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A follow-up survey of 1,087 physicians who had graduated from the University of California, San Francisco, School of Medicine from 1951 through 1971 was completed in 1977. A total of 307 (28.2 percent) of these persons were found to have left California. Comparison of the 307 who left with the 780 who remained showed only slight and statistically insignificant differences on most variables, such as sex, academic performance in premedical and medical education, educational level and social class of parents, age at entry into medical school, ratings by admissions interviewers, choice of specialty and a wide variety of personality inventory measures. Among the variables that did differentiate were place of birth, location and prestige of premedical college, preferences for subjects in the sciences and the humanities, and the Medical College Admission Test (MCAT) scores for quantitative ability and general information. However, attempts to combine these individual differentiators into clusters or equations from which to forecast emigration from California were unsuccessful.

CALIFORNIA is ordinarily thought of as a physician-importing state. A survey[1] taken in December 1973 found that of 46,022 California physicians, only 12,572 or 27.3 percent had taken their medical degrees in California schools. The American Medical Association report[2] on medical education in the United States, 1973-1974, noted that of 6,202 internships and residencies offered by California medical facilities only 1,708 or 27.5 percent were filled by graduates of California medical schools. This last figure may be compared with those of 38.7 percent for Pennsylvania, 55.3 percent for Oklahoma, 62.4 percent for Indiana and 73.3 percent for Nebraska.

Another index is afforded by the number of physicians per 1,000 population.[3] Among the larger American cities, Boston ranked first, New York second, San Francisco third and Los Angeles seventh. Yet, California ranked sixth from last among the states in the number of medical school graduates per inhabitant. Physicians in states other than California have noted and commented rather pungently on these differentials. For example, de Vise[3] observed that Illinois educates two to three

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times as many American doctors as it receives as interns, residents and licensed practitioners, where California educates half as many doctors per inhabitant as Illinois, but receives twice as many interns, residents and physicians.

It appears to be beyond dispute that California schools have trained no more than a third of the physicians who are practicing medicine in the state. What is less widely recognized is that this in-migration is only a part of the picture: there is also an out-migration of a certain number of California trained physicians who leave the state to practice elsewhere. At the Institute of Personality Assessment and Research, University of California, Berkeley, we have been working with a sample of 1,061 men and 134 women who were admitted to the University of California, San Francisco, School of Medicine from 1947 through 1967. Earlier reports on this project have dealt with issues such as specialty preferences,[4] comparison of students from medical and nonmedical families[5] and personality changes among women physicians.[6]

In arranging for a mailing of a follow-up questionnaire in 1972-1973 it was found that a substantial number of the graduates had taken up residence outside California. A systematic check of our returns, medical association records and state licensure listings led to the finding that of the 1,087 persons from our cohort who had taken the MD degree in San Francisco, 307 or 28.2 percent were now situated in out-of-state practices. The fact that an appreciable number of graduates leave California raises the interesting question of whether those who leave might be different in any detectable way from those who remain. A decision was therefore made to examine our research data in regard to this query.

Base Rates

Non-California birthplaces were recorded for 558 of our 1,087 physicians, giving an out-of-state base rate of 51.3 percent. Premedical education was completed in non-California colleges by 193 persons, giving an out-of-state base rate of 17.8 percent. As of the time of our final verification of location in August 1977, 307 of the physicians were in non-California locations, giving an out-of-state base rate of 28.2 percent.

States to which more than 10 graduates had emigrated included Maryland (30), Massachusetts (23), Oregon (20), Arizona (18), Colorado (17), Texas (13), Hawaii (12), New York (12) and Pennsylvania (11). There were five states in which no graduate was located: Arkansas, Delaware, South Dakota, Vermont and Wyoming. Thirteen reported addresses outside of the United States, including one in Canada and two in England.

Findings

Sex

A first analysis was carried out for sex. There were 115 women graduates in our sample, of whom 33 were in out-of-state locations. For the 972 male graduates the out-of-state frequency was 274. The departure rates of 28.7 percent for women and 28.2 percent for men were insignificantly different when evaluated by the chi-square test for the 2×2 table of frequencies.

Place of Birth

Place of birth was considered next. Of the 558 persons who had been born outside of California, 182 left after taking the MD degree. Their departure rate of 32.6 percent is slightly higher than the base rate of 28.2 percent, and the difference is statistically significant at the .01 level when evaluated by the chi-square test.

Premedical College

Location of the premedical college was also significantly related ($p<.01$) to the criterion dichotomy. There were 193 who had attended out-of-state colleges, and for them the departure rate was 40.9 percent. A prestige rating of the premedical college gave similar results. Using a scale proposed by Dawes,[7] ratings on a six-step continuum were assigned to each school. There were 222 graduates who had attended schools with higher ratings, of 4, 5 or 6. Their departure rate was 36.9 percent, significantly ($p<.01$) greater than the base rate of 28.2 percent.

Academic Performance

Attention was also paid to scholastic aptitude and performance in premedical and medical training, and to the kinds of courses liked most. Table 1 presents data comparing those who remained in the state with those who left. The 307 graduates who left the state were more or less indistinguishable from the 780 who remained in regard to premedical academic performance. Similarly, no significant differences were observed in academic performance in medical school. Grades in

TABLE 1.—*Comparison of Medical School Graduates Who Remained In or Left California*

Variables	Remained SRG	Remained SD	Left SRG	Left SD
Premedical Grade Averages				
Overall	3.28	0.33	3.30	0.33
Scientific subjects	3.35	0.39	3.38	0.37
Last two terms	3.34	0.39	3.37	0.39
Courses Liked Best				
Scientific rating	7.06*	2.02	6.78	1.92
Humanities rating	4.84	1.94	5.11*	1.85
Medical College Admission Test Scores				
Verbal	566.49	81.06	573.47	78.29
Quantitative	571.28	77.31	582.09*	77.26
General Information	561.60	79.17	575.66†	74.31
Science	583.01	69.14	590.16	59.77
Medical School Grades				
Year 1	50.23	9.55	50.04	9.35
Year 2	49.87	9.22	50.36	9.85
Year 3	49.98	9.63	50.16	10.23
Year 4	49.99	9.99	50.05	10.12
Cumulative	49.93	9.86	50.09	10.33

SD = standard deviation
SRG = scores, ratings or grades

*Mean higher, $p<.05$.
†Mean higher, $p<.01$.

medical school, it should be explained, are expressed in standard scores with a mean of 50 and a standard deviation of 10, whereas the premedical averages are in the usual form in which A equals 4, B equals 3, and so forth. The conversion for grades in medical school was necessary because of several changes made during the years of the study in the scales used for grading.

Subjects Liked Best

In the biographical inquiry completed by the students when we first saw them a question was asked concerning the three school subjects they liked best. The responses were rated on two scales developed by Goldschmid[8] to indicate an emphasis on either the humanities or the sciences. Values on the Goldschmid scales range from lows of 1.87, for comparative literature and dramatic arts on the science scale, to highs of 10.0, for physics on the science scale and philosophy on that for the humanities. Suppose that an entering student cited biochemistry, zoology and political science as the three subjects liked best. His "science" score would then be the average of the three assigned ratings, 9.8, 9.0 and 4.5, and his "humanities" score would be the average of the three ratings 2.1, 2.7 and 7.2.

The scientific and humanities ratings for subjects liked best both differentiated significantly between the graduates who stayed and left. Those who remained in the state had a slightly higher average on the science scale, whereas those who left had a slightly higher average on the humanities index. There were also very small but statistically significant differences on two of the MCAT scales. The graduates who left the state scored slightly higher on the quantitative and general information measures.

Nondifferentiating Variables

In addition to the variables already discussed there were many others that were analyzed but failed to produce significant differences. For example, the two groups were essentially the same in regard to education and social class of parents, ratings by the admissions committee interviewers and age at entry, and on personality inventory measures such as dominance, social presence, endurance, need:achievement, flexibility and autonomy.

Choice of Specialty

Current specialty was also unrelated to the dichotomy of stay versus leave. A 2×12 contingency table was constructed, pitting the stay-leave classification versus anesthesiology; dermatology; eye, ear, nose and throat (EENT); family medicine and general practice; internal medicine; obstetrics and gynecology; pathology; pediatrics; psychiatry; radiology; surgery, and other or unknown. Departure rates for the larger categories were very close to the base of 28.2 percent for the total sample. For example, there were 211 internists of whom 26.1 percent had left the state; departure rates of 26.0 percent, 28.6 percent and 26.4 percent were observed for surgery, EENT, and family and general practice, respectively. The highest figure was obtained for pathology, where 39.3 percent of the 56 physicians in the specialty had left the state, and the lowest was for obstetrics-gynecology where the rate was only 17.3 percent. In spite of these individual variations, chi-square for the table was only 12.98, which with 11 degrees of freedom had a probability of .29.

Combinations of Variables

No single sign or index showed more than a very slight relationship to the stay-leave dichotomy. The possibility of identifying a simple

combination of individual discriminators must still be examined. A stepwise multiple regression analysis was computed for the seven most promising variables: place of birth, location of premedical college, prestige of premedical college, science rating of subjects liked best, humanities rating of subjects liked best and two MCAT scores. Significant increments in reproducing the 0-1 criterion (stay or leave) were found for only three variables, out-of-state birth, out-of-state premedical college and high-prestige premedical college, each scored on a 0-1 basis. The multiple correlation for these three predictors was only .17, accounting for less than 3 percent of the variance in the stay-leave criterion.

A multiple cutoff analysis was also carried out, again using 0-1 scoring of the various predictors. That is, a value of 1 was assigned for attending a premedical college with a prestige rating of 4, 5 or 6, and a value of 0 for attending a college with a rating of 1, 2, or 3. On MCAT Quantitative, a value of 1 was assigned for scores of 650 or above, and a value of 0 for scores of less than this. A score of 0 or 1 was in this way assigned for each of the seven best differentiators, as listed in the preceding paragraph. This method also failed to produce a clear differentiation. For example, of the physicians with sign scores of 5, 6 or 7, 40.6 percent had left the state whereas 59.4 percent had remained. The rate of departure is significantly greater than the base rate of 28.2; nonetheless, the best prediction to make about persons with scores of 5, 6 or 7 is that they will remain in the state.

Discussion

What may be concluded from this analysis of 307 California-trained physicians who left the state after receiving their medical degrees? One conclusion is that the rate of departure is appreciable, 28.2 percent to be exact. In 1973-1974 the eight medical schools in California awarded 733 MD degrees. If the departure rate of 28.2 percent is accepted as valid, this means the loss of about 207 new physicians from California per year.

A second conclusion is that there are very few systematic differences between the graduates who leave and those who stay. For example, the two groups cannot be distinguished in regard to academic performance in either premedical or medical training, choice of specialty, sex, age at entry into medical school and social class of family, and personality variables such as dominance, autonomy, need:achievement, social presence and flexibility. There were three small but statistically significant differences on background factors. Doctors who left the state had more often been born in out-of-state locations, had more often attended out-of-state premedical colleges and had more often attended high-prestige premedical colleges. On the Medical College Admission Test they had slightly higher scores on general information and quantitative ability, and in their preferences for college subjects they gave slightly more emphasis to the humanities and slightly less to the sciences.

A third conclusion is that accurate forecasts concerning the eventual leaving of the state cannot be made at the time of entry into medical school, even if the differentiating signs just enumerated are combined by means of either multiple regression or multiple cutoff techniques. Significant relationships between the stay-leave dichotomy and clusters of from five to ten predictors were obtained, but at all values of these clusters the number of physicians who remained in the state was substantially greater than the number who left.

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